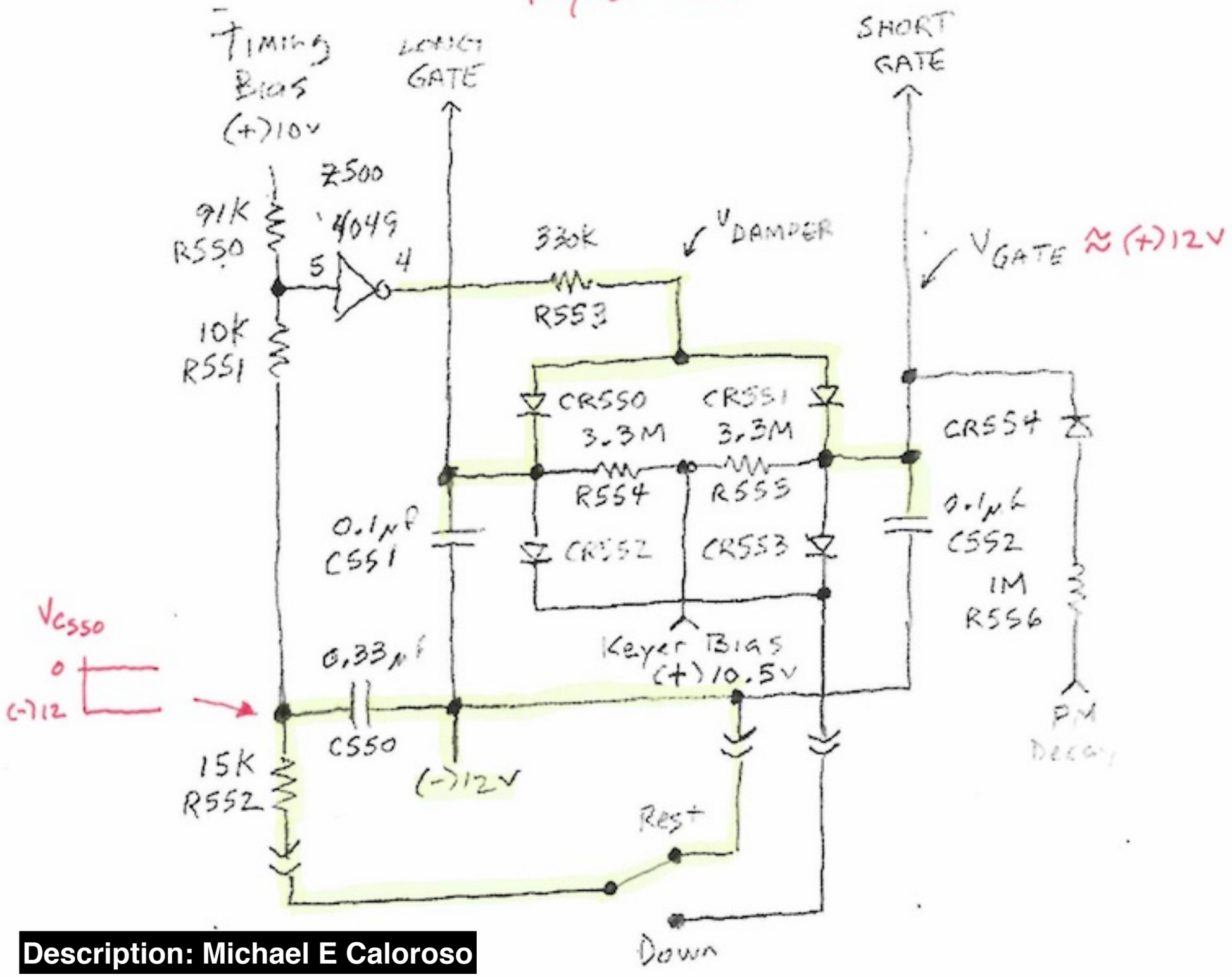
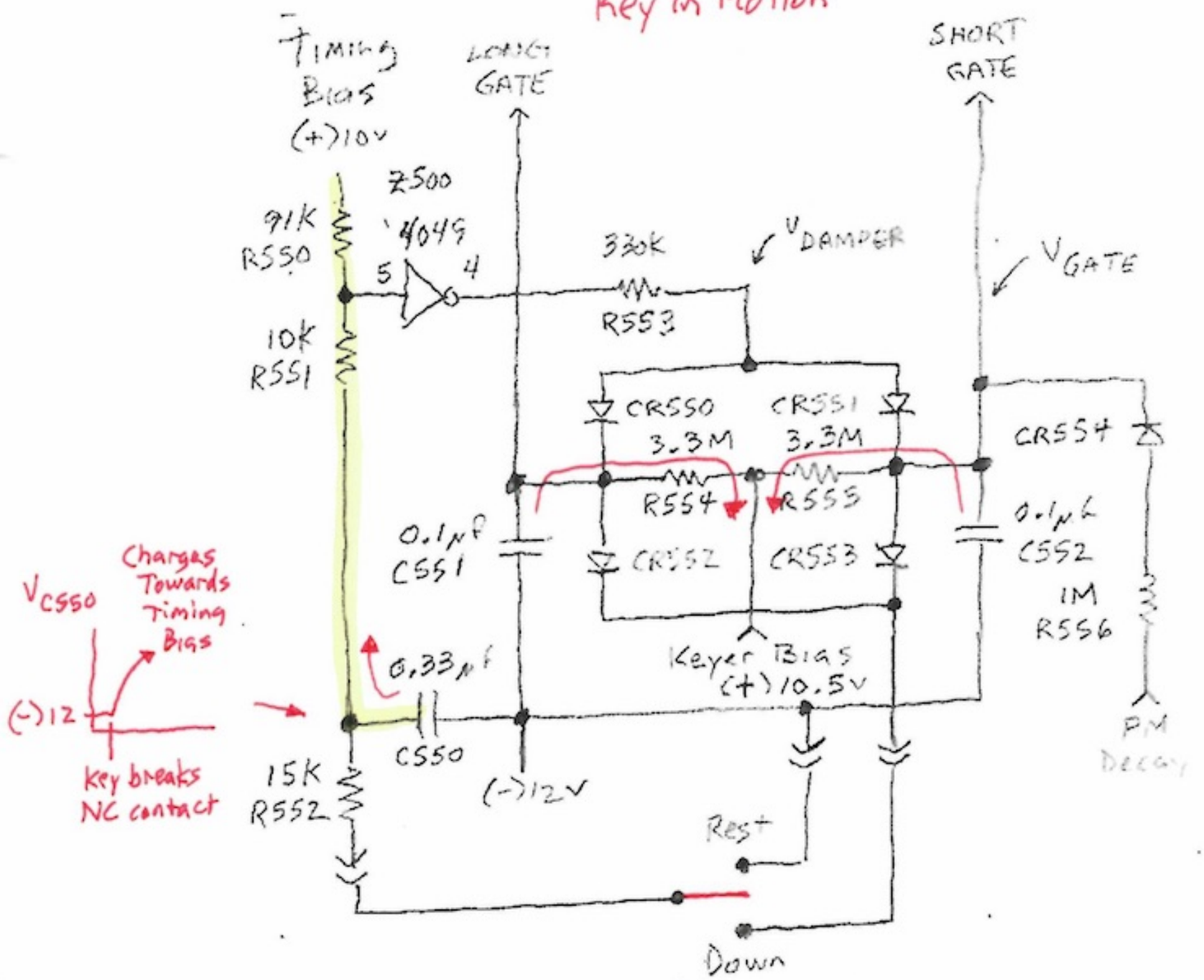
Key at Rest



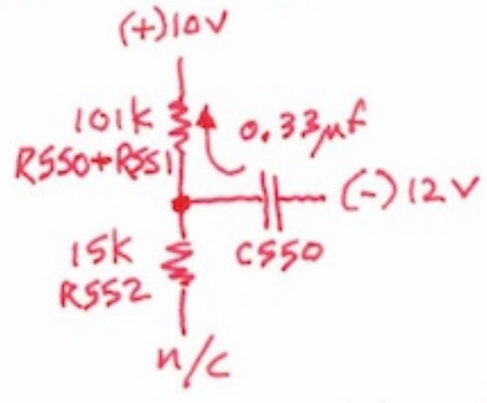
Description: Michael E Caloroso

- key contact @ NC → (-)12V
- charges C550 to (-)12V through R552
- V_{R550} @ input of Z500 pin 5 ≤ 0V ∴ logic low ∴ V_{DAMPER} is logic HIGH
- logic HIGH output of Z500 charges C551/C552 to ~12V through forward-biased CR550/CR551 and R553
- with gate signals >> 0V, keyer ICs will not gate signal ∴ audio is off

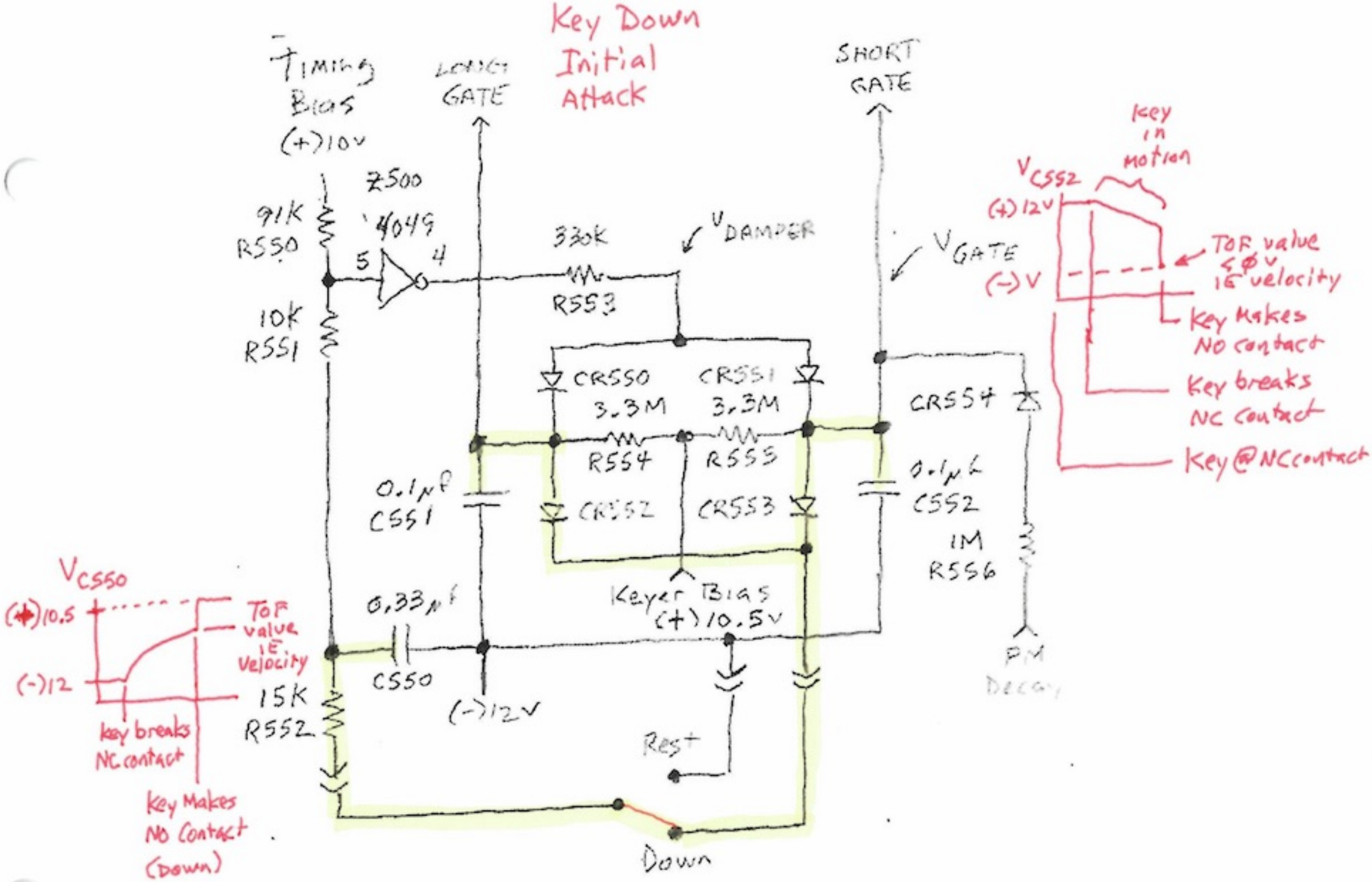
Key in Motion



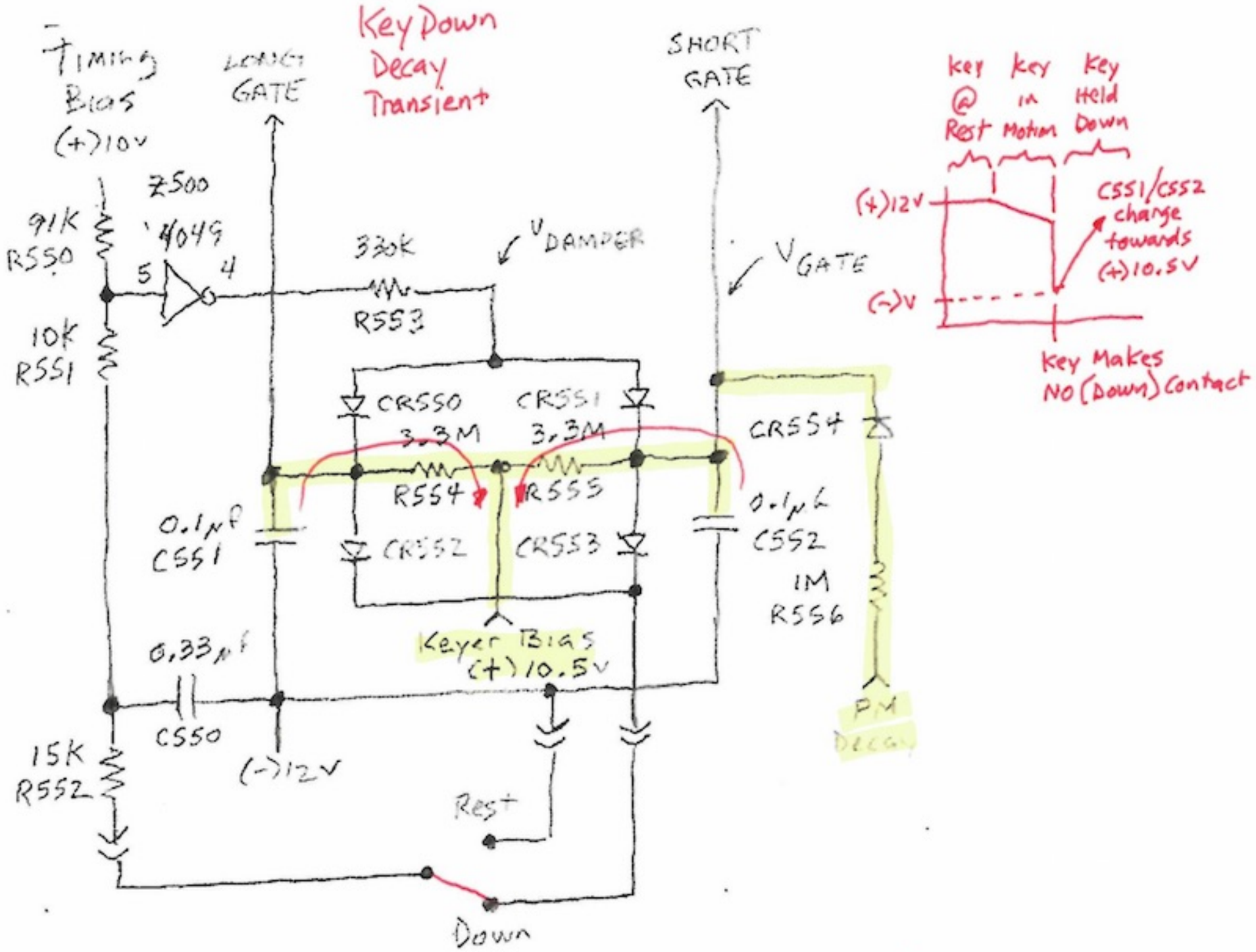
- (-)12v removed from key NC (Rest) contact
- C550 discharges towards (+)10v Timing Bias through R550 + R551



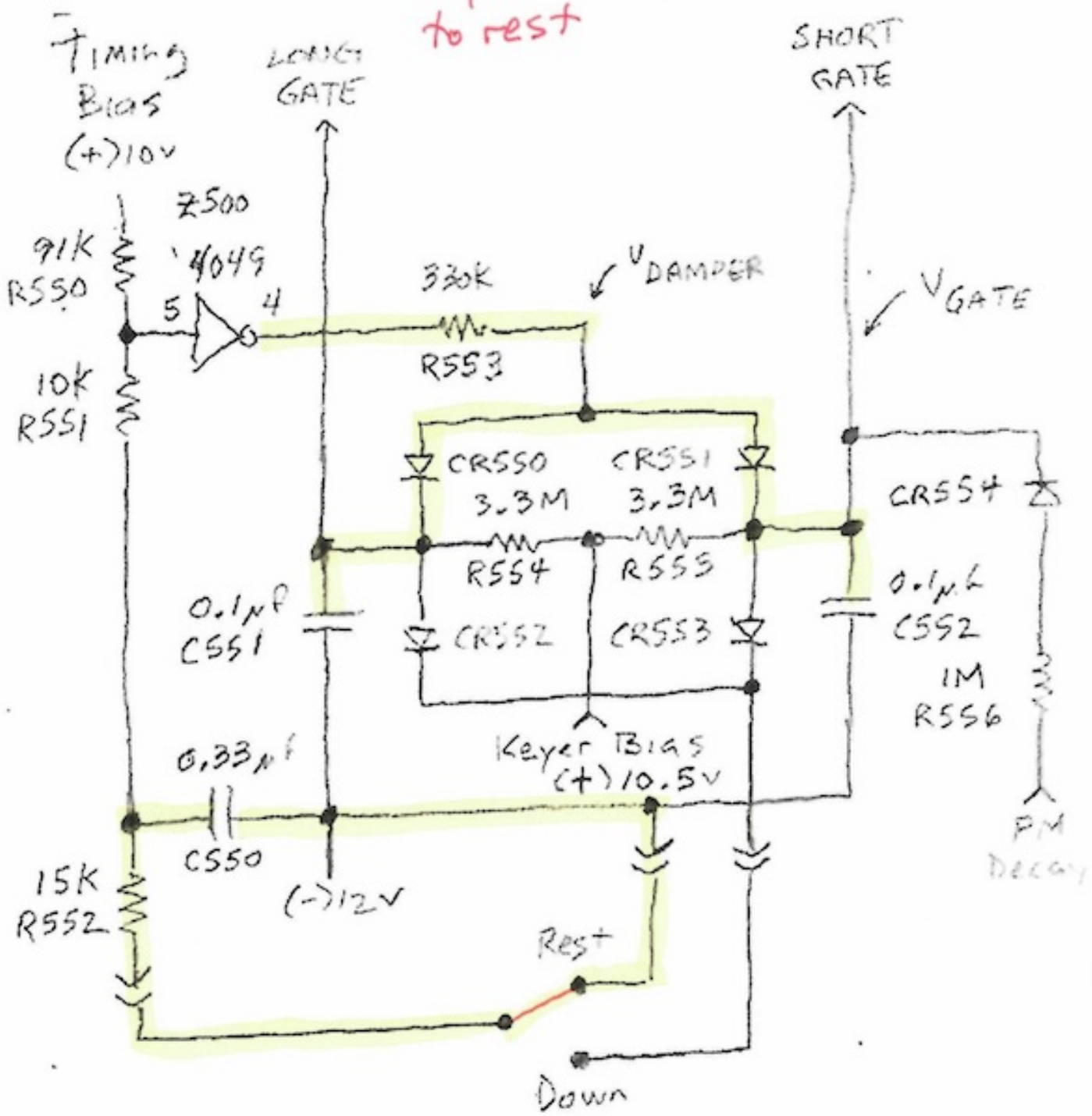
- Z500 input pin 5 transitions from logic low to logic high ∴ V_{DAMPER} is logic LOW
- Logic LOW output of Z500 reverse-biases CR550/CR551, isolating C551/C552 which discharge only through R554/R555 towards (+)10.5v. RC product is very large, and since discharge cap voltage is ≥ ∅v, keyer ICs will not gate signal ∴ audio is off



- Key NO contact → voltage
- Charge voltage on C550 forward-biases CR552/CR553 and immediately charges C551/C552 to voltage of C550 which are now < Ø v and the keyer ICs will now gate the signal and produce audio output.
- As key velocity is more rapid, C550 discharges less % the peak voltage on C550/C551/C552 is more negative and the keyer ICs will produce a louder audio output.



- C551/C552 begin to discharge towards (+)10.5v through R554/R555, which forms the decaying envelope contour voltage.
- As the voltage on C551/C552 transitions from a negative voltage to zero volts, the keyer ICs will gradually turn off the gate and the audio output decays to off.
- If CR554 is forward-biased (either via positive pulse chain or steady (+)10v) then this provides an extra discharge path for C552 which decreases the short envelope decay transient. PM Decay provides the pulse chain or steady voltage. If PM Decay is zero volts, then CR554 is reverse-biased and the discharge action on C552 is unaffected.



- Output of Z500 returns to logic HIGH, which forward-biases CR550/CR551
- Due to the RC product formed by R553 and CS51/CS52, these caps charge to ~12V, but not instantaneously; the RC product simulates the damping of a vibrating string.
- CS50 immediately charges to (-)12V through R552